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UPDATING ECONOMIC OPERATIONS IN THE POST INDUSTRIAL AGE

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This thesis addresses the economic aspect of coercive diplomacy to show that new instruments of coercive economic operations created by information age technology: 1) redefine coercive economic operations and 2) that the vulnerabilities and concerns brought about by these new economic instruments change the impact coercive economic operations have on coercive diplomacy. This thesis initially looks to the past, but the intention is to guide continuing future thought on coercive economic operations. This is important for coercive diplomacy because policy makers must be aware that ushered in with present and future technologies are new economic instruments which impact coercive economic diplomacy.

DoD KEY TECHNOLOGY AREA: Other (Coercive Diplomacy, Economic Sanctions)

KEYWORDS: Economic Operations, Economic Coercion, Economic Warfare, Economic Leverage, Economic Sanctions

THE POST COLD WAR CIVIL ENGINEER CORPS: WHAT HAS CHANGED AND WHY?

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With the end of the Cold War, the military services have experienced significant cuts in endstrength. Within the Navy, the Civil Engineer Corps (CEC) has also experienced some reductions. This thesis sought to determine how CEC endstrength is derived and whether it declined commensurate with overall naval officer endstrength. The command and billet structures for the CEC in 1986 and 1996 were used to represent the Cold War and Post Cold War respectively. The thesis determined how the CEC has changed and compared these changes to those that occurred in the larger naval officer community. One major finding is that CEC endstrength is indirectly affected by Naval officer endstrength and directly affected by the size of the infrastructure. Downsizing the military without downsizing infrastructure results in minor reductions in CEC endstrength. The CEC has experienced a 17 percent reduction in endstrength over the period, with more than 50 percent attributed to the closure of commands. Another finding is that these reductions have not changed the missions of the CEC, construction contract management, facilities maintenance, and advanced base construction.

KEYWORDS: Civil Engineer Corps, Seabees, Military Downsizing

DoD KEY TECHNOLOGY AREA: Manpower, Personnel, and Training

CONDUCT AND ASSESSMENT OF A2C2 EXPERIMENT 3 AND GUIDELINES FOR FUTURE EXPERIMENTATION

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The Adaptive Architectures for Command and Control (A2C2) project is sponsored by the Office of Naval Research (ONR) and is focused on analysis of joint decision-making at the operational level and adaptation of joint command and control

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architectures. To accomplish this objective, the A2C2 project team has conducted a series of human-in-the-loop experiments at the Naval Postgraduate School (NPS). The third experiment of the series was conducted during November 1997. This experiment differed from previous A2C2 experiments in that it focused on how organizations adapt their structure to maximize their effectiveness under changing events. This thesis reports on the planning and conduct of Experiment 3 with a focus on the contributions made by author and the Lead Team of officer-students and the analysis of their hypotheses. The author examines data collected during Experiment 3 in support of these hypotheses. A detailed statistical analysis is performed and results discussed. Finally, a discussion of lessons learned from the author's perspective pertaining to the experiment is given along with recommendations for conducting future experiments at NPS.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Modeling and Simulation

KEYWORDS: Adaptive Architectures for Command and Control (A2C2), Statistical Analysis of Measures of Effectiveness, Human-in-the-Loop Experimentation at NPS

ARTIFICIAL INTELLIGENCE AND FOREIGN POLICY DECISION-MAKING

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With the advent of a global information society, the U.S. will seek to tap the potential of advanced computing capability to enhance its ability to conduct foreign policy decision-making. This thesis explores the potential for improving individual and organizational decision-making capabilities by means of artificial intelligence (AI). The use of AI will allow us to take advantage of the plethora of information available to obtain an edge over potential adversaries. Another purpose of this thesis is to give guidance to the software community as to what policymakers will need in order to improve future decision-making processes. The third purpose is to encourage government and private sector decision-makers to allocate adequate resources to actualize the potential of AI. The method of analysis this thesis uses is to examine U.S. foreign policy decision-making on the cognitive or individual, group, and organizational levels. Using the Cuban Missile Crisis and the Yom Kippur War as test beds for critical analysis, identification of both decision enhancing and impeding functions is accomplished. Finally, a counterfactual analytic framework, using an AI model, tests the likely influence of AI on decision-making. The results substantiate the value of AI as both a decision-making enhancer and an impediment reducer for the policymaker. Additional conclusions are derived that improve the decision-making system and its processes by means of introducing an AI capability.

KEYWORDS: Artificial Intelligence, Foreign Policy, Cuban Missile Crisis, Yom Kippur War, Decision-Making, Cognitive Theory, Group Dynamics, Organizational Theory, Bureaucratic Politics, Decision Modeling, Decision-Making

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Computing and Software, Modeling and Simulation

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DESIGN CONSIDERATIONS FOR FUTURE DECISION SUPPORT SYSTEMS

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The Navy faces a future of increasingly complex warfare as it continues the shift in emphasis from the open-ocean to the littorals. This complexity arises from the larger number and more difficult nature of missions in littoral environments, plus the increasing sophistication of modern weapons. All of these factors combine to increase the pressure decision-makers will face in making engagement decisions.

By combining the techniques developed in the field of Naturalistic Decision-Making (NDM) with a decision-centered approach to the design of future decision support systems various aspects of the decision-making and execution process can be strengthened to enable decision-makers to react more quickly and confidently to the high tempo warfare they will face. A decision-centered approach to system design and training will support decision-makers in an environment characterized by high stress, ambiguity, and time pressure by enhancing situational awareness and strengthening the steps used to make quick and correct decisions.

The overall impact of a decision-centered approach to system design and training will be a vast increase in the speed of decision-making. This will enable a decision-maker to have the ability to react quickly to take advantage of changing circumstances, to consider a larger set of response options, to forestall enemy options, and to control the overall pace and direction of the conflict.

KEYWORDS: Decision Support Systems, Decision-Making, Tactical Decision-Making Under Stress (TADMUS), Naturalistic Decision-Making (NDM), Speed of Command, Speed of Decision-Making

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

THE UTILITY OF THE ADVANCED SEAL DELIVERY SYSTEM (ASDS) (U)

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The United States Special Operations Command (USSOCOM) is in the process of procuring the Advanced SEAL Delivery System (ASDS), a mini-submersible, to be used by Naval Special Warfare (NSW) forces to conduct maritime special operations. During the development of the ASDS, costs have more than doubled. Consequently, USSOCOM is reevaluating the future of ASDS. This thesis assesses the utility of the ASDS by viewing the ASDS as a part of an "infiltration system" and analyzing the linkages and fit of ASDS within the strategic framework in which it is intended to operate. Modeling the primary factors that define ASDS as a viable special operations platform in high, medium, and low threat environments does this. The output of the model is the capability of ASDS expressed in terms of "mission success." The estimated annual cost of ASDS is also calculated using the current acquisition strategy. In order to compare against current capabilities and their respective costs, this process is repeated for four alternative NSW infiltration systems. Although the ASDS has the highest cost, it is the only system that presents an acceptable probability of mission success in high and medium threat environments. Given NSW's strategic framework, the ASDS has a high utility.

DoD KEY TECHNOLOGY AREAS: Surface/Undersurface Vehicles-Ships and Watercraft, Modeling and Simulation

KEYWORDS: Advanced SEAL Delivery System, Mini-Submersible, ASDS, NSW, USSOCOM, Mission Success

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MODELING A JOINT COMBAT IDENTIFICATION NETWORK

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Today's battlefield is much more heterogeneous than in the past. With the emphasis on joint operations both within the U.S. military and in consort with coalition nations, the need for communications and sharing of tactical information across service and national boundaries has never been greater. A combat identification (CID) network that enables force's positions on the battlefield to be displayed at the appropriate granularity for the various levels of commanders would be a valuable tactical and strategic asset.

This thesis explores the possible network architectures and protocols available to implement such a system and determines, through modeling and simulation, the optimal design to minimize time performance of the flow of information through the network. Using a realistic scenario as a basis, system-engineering principles were used to generate an optimal network architecture from the design parameters chosen. The optimal design was determined to be a network consisting of an Asynchronous Transfer Mode (ATM) access type, asymmetric transmit and receive of messages, and network flow control implementation. Additionally, units on the battlefield should be grouped together by type within a region and the highest bandwidth possible should be used.

KEYWORDS: Combat Identification, Situational Awareness, Combat ID, Network Modeling

DoD KEY TECHNOLOGY AREAS: Battlespace Environments, Command, Control and Communications, Modeling and Simulation

THE ARSENAL SHIP CONCEPT: VULNERABILITIES TO SPECIAL OPERATIONS

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The United States Navy has solicited proposals for a revolutionary class of ship, the Arsenal Ship. Despite reduced funding for the project, the concept is still viable for future development. We show how the development of a new unparalleled weapon system or platform will evoke a response by potential adversaries, based on capabilities and asset investment, by unconventional means. The Arsenal Ship is a target across the spectrum of conflict. This thesis will describe threats that are usually overlooked and examine the Arsenal Ship's vulnerability to them. In addition, we will show how these vulnerabilities arise as the Arsenal Ship operates through the range of geographic areas. Further, this thesis describes possible strategic and tactical defensive actions to enable the Arsenal Ship to counter these unconventional threats. Each recommended action has a direct implication upon the engineered design and the proposed Concept of Operations (CONOP). In addition, the recommendations will influence the strategy for employing any further platform based on the Arsenal Ship concept, anywhere in the world.

DoD KEY TECHNOLOGY AREAS: Battlespace Environments, Command, and Control Communications, Conventional Weapons, Surface/Under Surface Vehicles-Ships and Watercraft

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KEYWORDS: Arsenal Ship, ARSHIP, Maritime Special Operations, and Special Operations, Combat Swimmer, VBSS, Visit Board Search and Seize, Unconventional Warfare.

THE EXPLOITATION OF OVERHEAD SURVEILLANCE AND RECONNAISSANCE IN SUPPORT OF NAVAL SPECIAL WARFARE

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Naval Special Warfare (NSW) operations have historically received a poor level of intelligence support. The importance of timely and comprehensive intelligence is paramount to these operations' tactical and strategic success. This lack of support stems from a lack of understanding by the Intelligence Community of the Essential Elements of Information that are requested by NSW and from a lack of knowledge by the NSW operators about existing systems and their capabilities and limitations. This report focuses on the Intelligence disciplines of Imagery Intelligence (IMINT) and Signals Intelligence (SIGINT). The presentation of this report focuses on educating both the user and the provider to the unique applications of these disciplines that will refine this *essential combat resource* into an effective and integral part of NSW operations. This report contains real world examples of existing and emerging systems.

The conclusions of this report address the necessity for early training of the junior officer corps of the NSW community. These are the operational leaders that will be directly effected by proper exploitation of this combat resource. This resource must also be the focus of NSW senior leadership in order for them to effectively support *forwardly deployed strategic warfighters*.

DoD KEY TECHNOLOGY AREAS: Sensors, Other (Intelligence)

KEYWORDS: Signals Intelligence, Imagery Intelligence, Requirements Process, Naval Special Warfare

AN ANALYSIS OF BANDWIDTH REQUIREMENTS FOR COLLABORATIVE PLANNING

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Any military operation, no matter how large or small requires some level of planning. Planning has become more complicated, requiring more interactions across geographical, functional, and organizational boundaries in a more compressed command and control decision cycle. For ships at sea, conducting planning with other units, at sea or on shore, is constrained by the availability of communications bandwidth and limitations of the tools used for real-time interactions. Emerging tools such as audio and video conferencing and shared whiteboard, enable real-time collaboration among dispersed forces, however, these tools are bandwidth "greedy," requiring more than is currently available on many ships. In an effort to determine what amount of bandwidth a ship needs, this thesis used simulation and modeling to experiment with combinations of bandwidth, collaboration tools, the number of planners, and the network delivery method used. In general, a bandwidth of 128 kbps enables two ships to conduct a video and audio session. Using multicast network delivery, 256 kbps enables a ship to collaborate with five other sites, and at 384 kbps, a ship can conduct a whiteboard with video and audio with up to eight other sites.

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DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications; Modeling and Simulation

KEYWORDS: Collaborative Planning

**POACHING AND COUNTERPOACHING IN SUB-SAHARAN AFRICA:
A STRATEGY FOR ENGAGEMENT, DEVELOPMENT, AND PROTECTION**

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The purpose of this thesis is to define the poaching problem in sub-Saharan Africa, to provide for the development of solutions, and to illustrate the significance of the problem to both Africa and the United States. This objective is achieved by illustrating the similarities between poaching and insurgency, developing a typology for the classification of different forms of poaching, and applying an insurgency/counterinsurgency model to these scenarios. Additionally, by addressing the negative effects poaching has on economic, political, and social issues we demonstrate that poaching is a problem that extends beyond the loss of selected animal species.

Through the application of our model to actual cases of poaching, we demonstrate the utility of drawing upon insurgency theory for providing solutions to the poaching problem. As a result, this thesis offers an atypical approach for systematically conceptualizing and implementing effective counterpoaching strategies. After developing a framework for analytically thinking about the poaching problem, we make recommendations regarding the role of specific U.S. forces within a comprehensive strategy of engagement. Finally, we comment on the importance of defining strategies whose methods of implementation are aligned with the desires, limitations, and capabilities of the host nation.

KEYWORDS: Environmental Security, Counterinsurgency, SOF Missions Wildlife Poaching

DoD KEY TECHNOLOGY AREAS: Other (Environmental Security, Counterinsurgency, SOF Missions)

**DOMESTIC TERRORISM AND WEAPONS OF MASS DESTRUCTION: AN
EVALUATION OF INTERAGENCY RESPONSE CAPABILITIES (A USER'S GUIDE) (U)**

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and

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The purpose of this thesis is to analyze and identify existing and potential flaws that inhibit integration of civilian and military agencies in response to domestic terrorist threats involving weapons of mass destruction (WMD). The study reviews the existing counterterrorism legal and institutional frameworks in conjunction with current interagency coordination mechanisms. The subsequent analysis of these areas revealed strengths and weaknesses that influence interagency response to domestic WMD terrorism. Corresponding recommendations for review and implementation are provided to

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assist improvement of current response capabilities. Furthermore, the recommendations offer a “model” that can be used to consider the transfer of authority from civilian to military control in times of specific domestic crisis.

DoD KEY TECHNOLOGY AREA: Chemical and Biological Defense

KEYWORDS: Domestic Terrorism, Counterterrorism, Weapons of Mass Destruction, Crisis Management, United States Code, Department of Defense, Department of Justice, Presidential Decision Directive 39, Presidential Decision Directive 62

STUDY OF A STORM: AN ANALYSIS OF ZAPATISTA PROPAGANDA

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The beginning hours of 1994 rang in both the New Year and the Zapatista uprising in Chiapas. Although in existence since 1983, the Zapatista movement was relatively unknown to the rest of the world until *Subcomandante Marcos*' propaganda offensive against the Mexican government. Steeped in historical references to indigenous exploitation and Emiliano Zapata, the Zapatista's call to arms and governmental reformation has continued to make effective use of symbols and rituals, reshaping the images of Indianness and economic suffering within Chiapas. The organization continues to garner support abroad as well as within Mexico through the use of the Internet, public media, and effective appropriation of nationalist symbols. What marks the Zapatista rebellion as extraordinary is its emergence as one of the first information age insurgencies to make such efficient use of these mediums.

This study presents a framework for analyzing propaganda, drawing from the fields of symbolic politics, cultural anthropology, and marketing. This symbolic frame is then applied to the Zapatistas in order to better understand the entire movement. The propaganda goals of the organization are examined, specifically addressing the areas of legitimacy, member unification, support both outside and within Mexico, recruitment, and challenges presented to the government.

KEYWORDS: Propaganda, Zapatistas, Ejercito Zapatista de Liberacion Nacional (EZLN), Symbolology, Mexico, Target Audiences, Insurgency, Rebellion

DoD KEY TECHNOLOGY AREA: Other (Psychological Operations/Special Operations)

ADAPTING THE MARINE AIR GROUND FORCE TACTICAL WARTIME SIMULATOR FOR USE WITH THE A2C2 EXPERIMENT

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The goals of the Office of Naval Research sponsored Adaptive Architectures for Command and Control (A2C2) research project are to study current and future joint command and control (C2) issues and develop theories about adaptive C2 architectures. The project includes three tiers of model-based human-in-the-loop experiments ranging from ones using simple, highly abstract computer-based simulations (Tier I), through more complex, realistic simulations (Tier II), to involvement in wargames and operational experiments (Tier III). Three Tier I experiments have been conducted to date, and a fourth is in planning. All have employed the Distributed Dynamic Decision Making III Simulation, developed for this type of experiment, and all have involved variants of the same amphibious scenario. The purpose of this thesis is to help the A2C2 research team prepare for Tier II experiments. The target platform for Tier II is the Marine Air Ground Task Force

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(MAGIF) Tactical Warfare Simulator (MTWS), a detailed and highly realistic stochastic simulation designed to train decision-makers. The author investigated the degree to which Tier I techniques and procedures can be transitioned to Tier II! MTWS by adapting the A2C2 scenario to the MTWS environment. This thesis also discusses extracting experimental data from MTWS.

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications, Modeling and Simulation

KEYWORDS: A2C2, MTWS, Command and Control, Architectures, Simulation

FOREIGN MILITARY SALES VERSUS DIRECT COMMERCIAL SALES

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The transfer of arms from the U.S. to other countries under the Security Assistance Program is done in two basic ways: government-to-government Foreign Military Sales (FMS), and contractor-to-government Direct Commercial Sales (DCS). These methods help to increase standardization and interoperability between the U.S. and its Allies. This study examines the U.S. arms sales policies and procedures for FMS and DCS. It is aimed at identifying the advantages and weaknesses of these methods and to provide information to the Turkish Navy decision-makers for future arms procurements. The objective of this study

is to improve the effectiveness and efficiency of the Turkish Navy in procuring weapon systems/services from U.S. sources.

The research found demonstrates that the choice of either FMS or DCS is driven by the special circumstances of the Turkish Navy, rather than by substantive differences in the two systems. The final decision on procurement methods with the U.S. depends on the country and items to be purchase. This study examines the major trade-offs between the FMS and DCS systems, and recommends the factors which the Turkish Navy should take into account to minimize costs, maximize effectiveness, and maximize efficiency.

DoD KEY TECHNOLOGY AREA: Other (Systems Acquisition Management)

KEYWORDS: Foreign Military Sales, Direct Commercial Sales, Turkish Navy, Arms Sales, Security Assistance

CURRENT AND FUTURE EFFORTS TO VARY THE LEVEL OF DETAIL FOR THE COMMON OPERATIONAL PICTURE

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The Joint Staff developed the Command, Control, Communications, Computers, and Intelligence (C4I) for the Warrior Concept in 1992 which stated that the warrior needs a fused, real-time, true representation of the battlespace. To help accomplish this vision, the Global Command and Control System (GCCS) was created. It provides the common operational picture described above, but only down to the unified commander.

This thesis is a comprehensive report that gives a complete review of the current situational awareness systems available to the commander in addition to current and future efforts to bring a common operational picture to all levels of command. The detailed discussions in the thesis of these systems will help students and researchers in the Joint C4I curriculum at the Naval Postgraduate School develop a better understanding of the difficulties in getting a true common operational picture to all services at all levels.

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KEYWORDS: Global Command and Control System, Common Operational Picture, Situational Awareness, C4I, Command and Control, Battlespace Management

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

ISRAELI NUCLEAR WEAPONS AND WAR IN THE MIDDLE EAST

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This thesis examines the influence of the Israeli nuclear weapons capability on conflict in the Middle East. There are two perspectives regarding the impact of nuclear proliferation on strategic stability. Three paths to strategic instability are examined: preventive attacks, preemptive attacks, and the escalation of conventional conflict to nuclear war. The optimistic perspective argues that nuclear weapons make preventive and preemptive attacks less likely, and keep conventional conflict from escalating to nuclear war. The pessimistic perspective argues the opposite—that nuclear weapons make preventive and preemptive attacks more likely, and raise the likelihood of escalation to nuclear war. My analysis of the Israeli cases shows that “opaque” nuclear proliferation decreases the pressure for preventive attacks, increases the chances for miscalculation, and creates sufficient concern about nuclear weapons to reduce the likelihood of preemptive attacks. Two factors help reduce the risk of nuclear proliferation as posed by proliferation pessimists, opaque nuclear weapons programs and nondeclaratory nuclear weapons policies. The implication of this research is that if the United States cannot dissuade a country from going nuclear, it should reinforce its incentives to maintain opacity and a nondeclaratory policy. Particular attention should be given to states which resist these efforts, as they represent the greatest risk of nuclear weapons use.

KEYWORDS: Israel, Nuclear Proliferation, Arab-Israeli Conflict, National Security Affairs

DoD KEY TECHNOLOGY AREA: Other (Nuclear Weapons)

LOW-END SOLUTIONS TO THE UNDERGROUND DILEMMA

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Both the 1981 Israeli Raid on the Osirak nuclear reactor in Iraq and the Gulf War, served notice to would-be proliferators that, in order to survive in the face of the conventional superiority of the United States and its allies, means must be developed to protect those assets deemed valuable or strategic in nature. Many would-be proliferators have chosen to develop underground structures, referred to as hardened and deeply buried targets (HDBT), as the preferred means to protect and hide their efforts to obtain weapons of mass destruction (WMD). To counter this trend, the U.S. relies almost entirely upon a policy of negotiated peacetime elimination or reduction of WMD/HDBT through diplomatic channels. Yet, if these efforts fail and the necessity for preemption or prevention emerges, instead of immediately relying on direct force alternatives, an indirect low-level interdiction method may be both more appropriate and available.

This thesis explores an alternative means by which the vulnerabilities of HDBT/WMD sites may be exploited through the use of low-level, indirect, counter-force strategies. This exploration of alternative HDBT interdiction approaches con-

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cludes that low-level counterforce strategies can complement existing counterproliferation initiatives, when employed as components of an overall campaign designed to deny and disrupt a would-be proliferator's progress.

KEYWORDS: Counterproliferation, Hardened and Deeply Buried Targets (HDBT)

DoD KEY TECHNOLOGY AREA: Other (Weapons of Mass Destruction)

DECISION AIDS IN AIRBORNE COMMAND AND CONTROL PLATFORMS

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As a result of dramatic growth in the capabilities of C4I systems, commanders have an immense amount of information available to them. Increased bandwidths and improved speeds in our communications systems can overload our commanders with data. One solution is improved methods of presenting information to the commander.

The same advances that threaten to overload the commander with data provide a solution. Improved technology now allows us to present the information in an easily assimilated graphical, 3D or "picture" form. These new types of displays can present the information in an intuitive style that eases the commander's cognitive workload and speeds comprehension. Recent studies comparing different types of displays support this theory.

Because commanders in airborne command and control platforms require a detailed understanding of a three dimensional environment, they should adopt some type of 3D display. Perspective or 2D displays are not perfect for absolutely every situation the commander will face; but the added understanding of the action, tactics and intentions of friendly and enemy forces demand its adoption.

DoD TECHNOLOGY AREAS: Battlespace Environments, Command, Control and Communications, Computing and Software, Human Systems Interface

KEYWORDS: Decision Aids, Command and Control (C2), Display, E-2C Hawkeye, Three Dimensional Displays

GREAT POWERS, WEAK STATES, AND ASYMMETRIC STRATEGIES

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On the verge of the twenty-first century, America finds itself in the position of a great power with dominant military technology. This thesis examines the possibility that weaker states may be able to strategically innovate and defeat us in war despite our technological advantages. The purpose of the thesis is to survey what type of strategic innovations, also known as asymmetric strategies, are possible and to examine the conditions under which they may be successful.

This thesis begins by defining asymmetric strategies using a comprehensive model of strategy developed by Rear Admiral J.C. Wylie. The thesis also examines four variables which may explain the success or failure of asymmetric strategies. To illustrate possible asymmetric strategies and examine the contextual conditions under which they work, the thesis considers the cases of the Italo-Ethiopian war of 1935-36, the Russo-Finnish War of 1939-40, and the American-North Vietnamese War of 1965-73. The thesis finds that the four variables have significant explanatory power for the success or failure of these strategies. The thesis concludes by examining strategic implications for the United States, both as a possible opponent of weak states and as a supporter of a weak state faced by a great power threat.

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KEYWORDS: Strategy, Strategic Innovation, Asymmetric Conflict and Military Technology, Future Wars, Italo-Ethiopian War, Russo-Finnish War, Vietnam

DoD KEY TECHNOLOGY AREAS: Battlespace Environments, Conventional Weapons, Other (Strategy)

INFLUENCE MODELING STATE-TERRORISM FOR INFORMATION OPERATIONS (U)

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Second Reader: Gordon McCormick, Special Operation Low Intensity Conflict Curriculum Committee

The purpose of this research is to use Situational Influence Assessment (SIAM) Module created by SAIC to model a terrorist organization that is attempting to disrupt negotiations between two state actors. The SIAM model was used to analyze the causal relationships and to look for the various leverage points at which to apply Information Operations (IO) that will minimize the effects of terrorist action, and influence the terrorists decision making process. The actors in a specific scenario were modeled as to how leadership could be influenced. After analysis with SIAM, possible IO options were created, incorporated into the model and tested to see how effective the IO options were at influencing the decision-making process. Once the IO options had been tested, a suggested plan of action results. Both a preventative approach and reactive approach are proposed. The preventative approach is intended to reduce the effectiveness of terrorism and impede the conduct of the terrorist organization. The reactive approach provides options for responding to terrorist activities without alienating the surrounding populace.

DoD KEY TECHNOLOGY AREA: Modeling and Simulation

KEYWORDS: SIAM, Terrorism, Information Operations, Peace Negotiations

NAVY SEALS: THEORY VS. REALITY

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Second Reader: Bard K. Mansager, Department of Mathematics

The purpose of this thesis is to examine two books that advance alternate theories to explain the success or failure of special operations. The first book is *Perilous Options: Special Operations as an Instrument of U.S. Foreign Policy*, by Lucien S. Vandenbroucke. Vandenbroucke discusses recurrent problems with U.S. special operations and identifies what he believes are the causes of failure of such operations. The second book is *Spec Ops*, written by William H. McRaven. McRaven examines eight historic cases from around the globe and develops his theory on how to conduct successful special operations. From the analysis of three recent Navy SEAL's special operations missions, both theories seem to provide a useful tool for thinking about the failure or success of special operations. Combining these theories provides a complete framework for senior planners and tacticians in formulating a plan for successfully conducting future special operations missions.

KEYWORDS: SEALs, Urgent Fury, Just Cause, Desert Storm

DoD KEY TECHNOLOGY AREA: Other (Special Operations)

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CONVERT SUBMARINE COMMUNICATIONS USING EXTRA HIGH FREQUENCY (EHF) TRANSMISSIONS (U)

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Donald Wadsworth, Space Systems Academic Group

This thesis quantifies the detectability of a transmitting U.S. nuclear submarine that is using EHF communications. This is done using a communications link analysis that is performed by circular equivalent vulnerability radius (CEVR) computer algorithm that displays its results in polar graph format. CEVRs for two different communication suites under alternative scenarios are calculated. Furthermore, by performing such an analysis onboard a submarine in precarious waters, the necessary real-time information for evaluating the risk of using such EHF communication transmissions would be available instantaneously.

KEYWORDS: Submarine, EHF, Communication

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

ANALYZING COMMUNICATION ARCHITECTURES USING COMMERCIAL-OFF-THE-SHELF (COTS) MODELING AND SIMULATION TOOLS

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Donald Wadsworth, Command, Control, and Communications Academic Group

There are many initiatives focused towards the pursuit of information systems capabilities—hardware, software, and architecture—and other technologies that will markedly enhance the command and control (C2) function. The overarching purpose of this thesis is to provide joint task force communication planners with the tools for planning and managing the increasing communications demand. To this end, this project had two goals, to compare the performance of two computer-aided modeling and simulation tools representing both ends of the cost and complexity spectrum, and to provide a subjective evaluation. Four computer models were developed to simulate Information Technology for the 21st Century (IT-21) and Joint Tactical Information Distribution System (JTIDS) networks using OPNET Modeler/Radio, by MIL3, and EXTEND by Imagine That, Inc. Although assumptions were made to simplify the models, simulation runs demonstrated that the network models developed using OPNET and EXTEND produced very similar and believable results. The JTIDS models results for data rate and message latency agreed within 3.5%. Similarly, IT-21 system models detected changes and trends caused by different system loads. The results indicate that low cost, commercial off-the-shelf modeling tools can be used to describe various networks used in joint operations.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Modeling and Simulation

KEYWORDS: JTIDS, Link-16, IT-21, EXTEND, OPNET, Modeling and Simulation, Command and Control, Architectures, Simulation

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KOREAN UNIFICATION: A UNITED STATES ARMY SPECIAL FORCES FRAMEWORK FOR EMPLOYMENT

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As Korea approaches unification, the growing stability problems in the north create questions about how these problems can be approached to avoid destabilizing the peninsula upon unification. This thesis predicts and analyzes the significant stability and support operations likely to confront the Republic of Korea (ROK) Army during post-conflict or post-unification proceedings, and presents an employment framework for United States Army Special Forces (USASF) designed to support the ROK Army's efforts. The employment framework is designed to complement a theater-level strategic plan for conducting stability and support operations (SASO) in the north occurring along a suggested spectrum of unification possibilities. The framework consists of three elements: the SASO missions predicted, framework doctrinal elements, and four Korean unification scenarios. Doctrinal elements include the operations, missions, and unique roles USASF conduct during SASO. The utility of this thesis is the analysis of framework doctrinal elements in relation to the SASO missions and unification environment that may confront USASF while supporting the ROK Army in successful completion of these missions. The USASF employment framework is intended to be used as an aid for U.S. military planners at the strategic, operational and tactical levels during the deliberate planning process for post-conflict or post-unification operations in the north.

KEYWORDS: Korean Unification, United States Army Special Forces, Stability and Support Operations

DoD KEY TECHNOLOGY AREAS: Other (Force Employment and Stability, Support Operations)

THE DEVELOPMENT OF A LITTORAL REGION AREA COMMUNICATIONS NETWORK IN SUPPORT OF OPERATIONAL MANUEVER FROM THE SEA

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Despite the apparent abundance of modern communication technology such as satellites, computers, and fiber-optic transmission systems, communication capacity is a limited resource for littoral operations. The Navy and Marine Corps lack the dedicated networks to support such doctrinal concepts as Operational Maneuver From the Sea (OMFTS). One solution is to develop a Littoral Region Area Network (LRAN). The primary goal of this thesis is to underscore the littoral operating environment and bandwidth requirements. It also investigates reliable seaborne network communication systems complementary to satellite and wireless networks, and proposes an open, standards-based modular architecture, utilizing a network centric design model as the basis for LRAN. It employs modeling and simulation techniques to demonstrate coupling of the system integration processes with the doctrinal concepts of OMFTS.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Other (Information Technology)

KEYWORDS: Networks, Aerostats, Littorals, Operational Maneuver from the Sea (OMFTS), Communications, Modeling and Simulation, IEEE 802.11, ADNS, Marine Corps Tactical Data Network

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ANALYSIS OF NATIONAL OVERHEAD INTELLIGENCE COLLECTION (U)

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Master of Science in Space Systems Operations-March 1998

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Space systems provide wide-ranging support to the military and the National Command Authority (NCA) during any developing crisis. This thesis explores how the national systems responded to such an event against the geopolitical backdrop of world events. Each system architecture's capability and role is examined in detail. The entire satellite process is covered from the tasking process and distribution of assets through the dissemination of information to NCA decision makers and on scene military commanders.

DoD KEY TECHNOLOGY AREAS: Space Vehicles, Other (Intelligence)

KEYWORDS: Signals Intelligence, Imagery Intelligence, Requirements Process

COMMAND IN THE 21ST CENTURY: AN INTRODUCTION TO CIVIL-MILITARY RELATIONS

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Lt Col John H. Gibson, Command, Control, and Communications Academic Group

This thesis serves as an introduction to civil-military relations and the just war tradition for Joint Command, Control, Communications, Computers, and Intelligence (C4I) students taking CC3000 or an equivalent course. The goal of this thesis is to provide the student with a broad understanding of these subjects. The author intends this thesis to be used as a supplementary reading in CC3000.

This thesis addresses the following: professionalism and its relationship to the study of civil-military relations, the roles of the military in society, civilian control and the various schools of thought associated with it, historical and legal precedents for the American civil-military relationship, the just war tradition, various issues affecting current and future civil-military relations in the United States, the impact of military operations other than war (MOOTW) on civil-military relations and the military ethos, and, finally, the applicability of the just war tradition to the MOOTW environment.

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

KEYWORDS: Command, Civil-Military Relations, Just War Tradition

APPLICATIONS OF JOINT TACTICAL SIMULATION MODELING

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Advances in technology allow Computer Simulation Models (CSM) to be used as a powerful tool to aid military decision-makers. This thesis explores the usefulness of one of these models, the Joint Tactical Simulation (JTS). First, this thesis outlines the information and tasks required to run JTS, which will give the reader a basic understanding of the program and how much effort it requires. Next, it describes the scenario presented in this thesis by detailing the methodology of terrain

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development, listing the assets required and the mission concept employed. It concludes by discussing some of the advantages and disadvantages of JTS followed by a reevaluation of the simulation and its possible uses.

The concluding appendix is a tutorial that guides the reader through an amphibious assault modeled on the UNIX-based computer systems at the Naval Postgraduate School's (NPS) Secure Systems Technology Laboratory. It was designed to be accomplished in less than four hours and give the user an opportunity to run a simulation while conducting minimal interaction.

KEYWORDS: Joint Tactical Simulation, Naval Special Warfare, High Resolution Models

DoD TECHNOLOGY AREA: Modeling and Simulation

ANALYSIS OF THE DIGITAL VIDEO BROADCAST STANDARD FOR USE IN THE GLOBAL BROADCAST SERVICE ARCHITECTURE

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The demand for robust, space based, communication systems, for the Department of Defense, continues to increase. The proposed architecture for the Global Broadcast Service (GBS) will meet many of these demands. GBS is a Department of Defense CONUS-based Direct Broadcast Satellite (DBS) project utilizing commercial-off-the-shelf components for the transmission and reception of video, Internet Protocol (IP) and Asynchronous Transfer Mode (ATM) data transmissions. The satellite transmission standard plays a key role in the success of the GBS program. In November 1997 the GBS prime contractor, Hughes Information Systems, announced the use of the Digital Video Broadcast (DVB) standard as the satellite transmission standard for GBS.

This thesis presents an independent evaluation supporting the use of the DVB standard within the GBS architecture. Data contained in this thesis evaluates the theoretical effectiveness of the GBS system while using the DVB transmission standard. This thesis contains a comparison of the DVB supporting documentation against the GBS requirements documentation. The conclusions of this thesis strongly support selection of the DVB standard as the satellite transmission standard for GBS.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Manufacturing, Science and Technology, Space Vehicles

KEYWORDS: Global Broadcast Service, Command, Control, and Communication Systems, Direct Broadcast Satellites,